Listing of Claims

1.   (Currently Amended) A gatekeeper cluster comprising:

one zone divided into at least two sub-zones in a communication system;

at least one alternative gatekeeper providing redundancy for each sub-zone; and

<u>a pass between the sub-zones to provide redundancy for setting up a call, wherein the pass includes one or more routes between the sub-zones which provide call set-up redundancy based on location request (LRQ) signaling, said LRQ signaling including:</u>

<u>transmitting a location confirm (LCF) message from a gatekeeper in a first sub-zone to a gatekeeper in a second sub-zone, the LCF message including at least one of information indicating that the gatekeeper in the first sub-zone is available to set up the call or address information corresponding to one or more alternative gatekeepers in the first sub-zone, or</u>

<u>transmitting a location rejection (LRJ) message from the gatekeeper in the first sub-zone to the gatekeeper in the second sub-zone, the gatekeeper in the second sub-zone updating information to indicate that the gatekeeper in the first sub-zone is unavailable to set up the call</u>

~~at least one route providing redundancy for a pass between the sub-zones, wherein the redundancy provides a dispersion function based on a backup function.~~

2.   (Original) The gatekeeper cluster of claim 1, wherein the alternative gatekeeper

provides redundancy by one master gatekeeper and at least one standby gatekeeper, the master

gatekeeper by itself operating as the gatekeeper of the sub-zone thereof.

3.   (Currently Amended) The gatekeeper cluster of claim 1, wherein the at least one

alternative gatekeeper gatekeepers of each sub-zone have has access to a zone routing table.

4.   (Currently Amendedl) The gatekeeper cluster of claim 3, wherein the zone routing

table determines to which zone a call is routed with reference to a telephone number of a callee,

when there is no desired number in the zone managed by the an alternative gatekeeper in one of

the sub-zones.

5.   (Currently Amended) The gatekeeper cluster of claim 3, wherein the zone routing

table contains a gatekeeper identifier used for authentication during signaling between the sub-

zones, a zone prefix representing a number schedule of each sub-zone, a gatekeeper type

indicating any one of the alternative gatekeeper and the gatekeeper of a neighbor zone, and a

priority representing a priority of the alternative gatekeepers, the gatekeeper in the second sub-

zone updating the routing table based on information contained in the LCF or LRJ message.

6.   (Original) The gatekeeper cluster of claim 5, wherein the gatekeeper identifier is

equally given to all the alternative gatekeepers within any one of the sub-zones.

7.   (Currently Amended) A method for operating a gatekeeper cluster, comprising:

dividing one zone into at least two sub-zones in a communication system;

providing first redundancy of at least one alternative gatekeeper for each sub-

zone; and

providing second redundancy of at least one route for a pass between the sub-

zones, wherein the ~~redundancy provides a dispersion function based on a backup function~~ the

pass includes one or more routes between the sub-zones which provide call set-up redundancy

based on location request (LRQ) signaling, said second redundancy being performed based on

information contained in at least one predetermined field of a location confirm (LCF) message

or a location rejection (LRJ) message transmitted between alternative gatekeepers in the sub-

zones.

8.   (Currently Amended) The method of claim 7, wherein the alternative gatekeepers

provide said first redundancy by maintaining at least one master gatekeeper and at least one

standby gatekeeper in each sub-zone, the master gatekeeper by itself operating as the gatekeeper

of the sub-zone thereof.

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9.   (Currently Amended) The method of claim 8, wherein the <u>second</u> redundancy ~~of the alternative gatekeepers~~ <u>further</u> comprises, when the master gatekeeper receives an arbitrary request (xRQ) message from a terminal, searching an alternative type gatekeeper in a routing table, encoding the searched alternative type gatekeeper, transmitting an arbitrary confirm (xCF) message to the terminal, and setting up <u>the</u> [[a]] call.

10.   (Currently Amended) The method of claim 8, wherein the <u>second</u> redundancy ~~of the alternative gatekeepers~~ <u>further</u> comprises, when the standby gatekeeper receives an arbitrary request (xRQ) message from a terminal, performing heartbeat signaling for master polling in order to check whether the master gatekeeper operates normally.

11.   (Original) The method of claim 10, wherein the heartbeat signaling comprises:

at the standby gatekeeper, generating an information request (IRQ) message, transmitting the generated information request message to the master gatekeeper, and checking whether or not there is a response from the master gatekeeper;

if there is any response, at the standby gatekeeper, searching an alternative type gatekeeper in a routing table to encode the searched alternative type gatekeeper and transmitting an arbitrary reject (xRJ) message to the requesting terminal;

generating an arbitrary request (xRQ) message at the terminal receiving the

arbitrary reject (xRJ) message, transmitting the generated arbitrary request (xRQ) message to the

master gatekeeper, and requesting to set up a call; and

generating an arbitrary confirm (xCF) message at the master gatekeeper receiving

the arbitrary request (xRQ) message, transmitting the generated arbitrary confirm (xCF) message

to the terminal, and setting up the call.

12. (Original) The method of claim 11, wherein the routing table contains a

gatekeeper identifier used for authentication during signaling between the sub-zones, a zone

prefix representing a number schedule of each sub-zone, a gatekeeper type indicating any one of

the alternative gatekeeper and the gatekeeper of a neighbor zone, and a priority representing a

priority of the alternative gatekeepers.

13. (Original) The method of claim 11, wherein the heartbeat signaling further

comprises, if there is no response, the standby gatekeeper being changed into the master

gatekeeper, searching the alternative type gatekeeper in the routing table, encoding the searched

alternative type gatekeeper, transmitting the arbitrary confirm (xCF) message to the terminal, and

setting up the call.

14. (Original) The method of claim 13, wherein the heartbeat signaling further comprises:

at the gatekeeper changed into the master gatekeeper, transmitting the arbitrary confirm (xCF) message to grant registration of the terminal, generating a Nonstandard message and transmitting the generated Nonstandard message to other gatekeepers;

when the gatekeeper having already operated as the master gatekeeper among the other gatekeepers receives the Nonstandard message, comparing a time of the gatekeeper itself with a time of the Nonstandard message; and

if the time of the gatekeeper itself is faster than the time of the Nonstandard message, at the gatekeeper having already operated as the master gatekeeper, generating the Nonstandard message, transmitting the generated Nonstandard message to the gatekeeper changed into the master gatekeeper, and changing into the standby gatekeeper again.

15. (Original) The method of claim 14, wherein transmitting the Nonstandard message comprises:

recording a time when the alternative gatekeeper is changed into the master gatekeeper, and

informing the other gatekeepers of the recorded time using the Nonstandard message.

16.   (Original) The method of claim 14, wherein the heartbeat signaling further

comprises:

generating the arbitrary request (xRQ) message at the terminal receiving the

arbitrary confirm (xCF) message, transmitting the generated arbitrary request (xRQ) message to

the gatekeeper changed into the master gatekeeper, and requesting to set up the call; and

when the gatekeeper changed into the master gatekeeper is recognized to be the

standby gatekeeper to be changed into the standby gatekeeper again and receives the arbitrary

request (xRQ) message, performing again the heartbeat signaling for master polling.

17.   (Currently Amended) The method of claim 7, wherein the redundancy of the

route comprises:

when the first alternative gatekeeper of the first sub-zone receives the arbitrary

request (xRQ) message from the caller terminal of the first sub-zone, checking whether or not a

callee number exists in the first sub-zone;

if the callee number does not exist in the first sub-zone, at the first gatekeeper,

transmitting the arbitrary request (xRQ) message to the second gatekeeper of the second sub-

zone with reference to the zone routing table;

when the second gatekeeper is the master gatekeeper, generating the arbitrary

confirm (xCF) message, transmitting the generated arbitrary confirm (xCF) message to the first

gatekeeper, and authenticating the caller terminal;

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at the authenticated caller terminal, generating a set-up message and transmitting the generated set-up message to the callee terminal of the second sub-zone through the first gatekeeper;

at the callee terminal, generating the arbitrary request (xRQ) message and transmitting the generated arbitrary request (xRQ) message to the first gatekeeper through the second gatekeeper;

at the first gatekeeper, generating the arbitrary confirm (xCF) message containing signaling information of the first gatekeeper and transmitting the generated arbitrary confirm (xCF) message to the callee terminal through the second gatekeeper;

at the callee terminal, generating an alerting message and transmitting the generated alerting message to the caller terminal through the second and first gatekeepers;

at the callee terminal, generating a connect message and transmitting the generated connect message to the caller terminal through the second and first gatekeepers; and

transceiving H.245 signaling between the callee terminal and the second gatekeeper, between the second gatekeeper and the first gatekeeper and between the first gatekeeper and the caller terminal to allow carrying on a conversation with each other.

18.   (New) A method for operating a gatekeeper cluster, comprising:

dividing one zone into at least two sub-zones in a communication system;

providing first redundancy of at least one alternative gatekeeper for each sub-zone, the first redundancy provided by maintaining at least one master gatekeeper and at least one standby gatekeeper in each sub-zone; and

providing second redundancy of at least one route for a pass between the sub-zones, the second redundancy provided by performing heartbeat polling between alternative gatekeepers in order to check whether the master gatekeeper is operating normally, wherein said heartbeat polling is performed based on transmission of a non-standard H.323 message.